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HISTORY OF STRATEGIC BOMBING COMMUNICATIONS

The mission of strategic bombing created some unusual problems in communications which had to be met and overcome in order to accomplish that mission. A primary consideration were the great distances involved. The Commanding General was in Washington, D. C., his deputy in Hawaii (or Guam), the Twentieth Air Force in the Marianas, the XX Bomber Command in India and China, and the Eighth Air Force in Okinawa. Instantaneous communications were required between the commander and his units spread over two-thirds of the world.

This far-flung communications network was entirely dependent upon radio, except in the local areas itself, for fast, reliable, and secure communications. This could not be the type of radio communications normally provided tactical units where messages were encoded, then passed to a radio operator who manually sent a morse character for each letter and number in the message which in turn had to be received and decoded at the far end. Radio teletype equipment had been developed which provided typewritten transmission of messages at sixty words a minute. In addition, instantaneous enciphering and deciphering equipment had been developed to work in conjunction with the radio-teletype equipment. The messages transmitted in this manner did not require paraphrasing to safeguard the code, and as many copies could be prepared as were required by interested agencies of the headquarters and distributed simultaneously.

This method of communications was the most rapid and secure system which had been developed by the Army for radio communications. It was superior to anything developed by our enemies (or our allies) and greatly speeded our strategic operations. Indeed, it is doubtful that such widely separated units could have been controlled from one central point except by such a system. It was decided that this radio teletype system with integrated cryptographic equipment would be used in Strategic Air Force operations down to and including wing headquarters. Since all groups and squadrons of a wing were located on the same airfield, this meant that all strategic air units were connected with an almost instantaneous means of communication.

The setting up of this system was not an easy one. Only a few of the major difficulties will be mentioned. In the first place, the equipment had been developed for use on only the most important circuits between the highest theatre headquarters to handle a great quantity of secret and top secret material. In the most rapid form used by the Air Forces with "on line" integrated cryptographic equipment it had been authorized to handle only personal Top Secret conferences between the highest commanders. To get authorization from the War Department for general use of this equipment by all strategic air units down to wing headquarters was no small task in itself.

After authorization came the problem of obtaining high powered fixed type radio transmitters and special diversity receiving equipment with the associated teletype terminal and cryptographic equipment, all by special project. Every means possible was utilized to expedite procurement. Even with air shipment, equipment arrived at the last moment;

only by working night and day could the equipment be installed and operating in time to meet requirements. Never were spare equipments available as replacement or to meet the next requirement. Yet instantaneous communication was required twenty-four hours a day, and in general the practically impossible was accomplished.

We cannot forget the men who made this possible. They were pitifully inadequate both in number and in training to do this job. The Air Force communications organizations could not be changed in time and the few equipments available could not be spared for training due to operational requirements. The men learned the hard way but the fast way - on the job and under tremendous pressure.

Deadlines were sometimes quite nerve wracking. On the day scheduled for the first bomb strike on Japan by B-29's based in the Marianas, communications arrangements were not yet complete. But when the "Bombs Away" report from planes over Japan was sent to the 73rd Wing on Saipan, it was relayed through headquarters in the Marianas and the Hawaiian Islands and delivered to the Commanding General in Washington, D. C. within seventeen minutes, practically as fast as the message could be relayed at sixty words a minute.

Many unusual problems were encountered and vanquished. Immediate telephone and teletype communications were required from Twentieth Air Force Headquarters on Guam to its wings on Saipan and Tinian. It was actually a harder problem to provide continuous communications over this 120 mile link than it was over the 7500 mile route to Washington, D. C. Low frequency and high frequency equipment were tried without much success due to atmospheric disturbance and poor radio wave propagation over this distance. Then very high frequency equipment, which has line of sight

characteristics, was tried. Although the distance was greater than line of sight, equipment was placed at the highest points on Guam and Saipan, and communications were established, but only part of the time, which was not good enough. The communication link passed over heavy jungles and over Jap held Rota which was higher than Guam or Saipan. Finally extra relays were put in which directed the radio waves at a lower elevation but entirely over water, and this time it worked, and all of the time. Many technical factors contributed to this success, but probably a phenomenon unknown at that time was a major factor. That is, when an increase in temperature with height or a decrease in humidity with height or a combination of the two occurs, very high frequency radio waves are trapped in a duct close to the earth with the result that communications ranges are far greater than line of sight.

Every new or conventional type of communications and radar equipment suitable to strategic air operations was utilized. The Air Communications Service (then designated the Army Airways Communications System) provided all useful types of navigational aid and airways service. They included ranges, direction finders, control towers at fields, radio and radar beacons and Loran (a new means of accurate long-range navigation). Both radio instrument approach and radar ground controlled approach systems were provided to enable aircraft to land in bad weather. A comprehensive traffic control system was operated to space and control aircraft so that the great numbers of aircraft returning from a mission could be landed in the shortest possible time. A network of new type direction finders were set up which instantaneously took bearings on electrical discharges in storm clouds and accurately fixed the location and course of the storm. Broadcasts of weather information were

furnished outlying bases and planes in flight. A major feature of this weather system was the broadcast of information using four high powered transmitters operating simultaneously on four different frequencies thus giving twenty-four hour a day service to any point whether one mile or five thousand miles from Guam. Again radio-teletype equipment with instantaneous enciphering and deciphering equipment was used. Never before had it been possible to transmit so rapidly such a great quantity of secure weather information to so many points over such a great area.

Fighter planes flying from Iwo Jima to Japan as fighter escort for the B-29's had little room for navigational equipment in the plane and were furnished homing adaptors to their very high frequency communication set which allowed them to home on a B-29 in flight.

A complete air-sea rescue communication system was operated in conjunction with the Navy which provided rescue by submarines and destroyers coordinated with B-29's dropping rescue equipment and B-17's which even dropped motor boats.

Although radio has been stressed, wire was by no means a small factor in expediting operations. Large telephone switchboards were operated by air communications units at or near each headquarters and air field giving "stateside" type service. Even here, radio-telephone circuits were provided so that telephone calls could be made to adjacent islands.

Strategic air units used the most rapid and secure type of communications known to man at that time to provide the global command and intelligence system required for operations, and it may be said that only through use of this new system of secure, instantaneous and high traffic volume radio network were their far-flung operations possible.

STRATEGIC AIR COMMAND AND INTELLIGENCE NETWORK FULL DUPLEX RADIO TELETYPE

